

Amdt. dated January 3, 2006
Reply to Office action of October 31, 2005

Serial No. 09/972,386
Docket No. SJO920010037US1
Firm No. 0037.0118

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1. (Currently Amended) In a storage area network (SAN) comprising one or more digital data processors in communication with one or more storage devices, wherein at least a selected one of the digital data processors operates under an operating system having

a port driver defining a software interface between a class driver and an adapter to which one or more of the storage devices are coupled,

the class driver for claiming one or more of the storage devices for access by the operating system and any application programs executing therein by invoking the port driver to which the selected digital data processor is coupled,

the improvement comprising:

a filter in communication with the port driver and the class driver, the filter intervening to block claiming of one or more of the storage devices by the class driver,

the class driver issuing a claim request to the port driver for a selected one of the storage devices,

the port driver issuing a response to the class driver,

the filter intercepting the response from the port driver, determining whether the selected storage device has been assigned to the selected digital data ~~possessor~~ processor, and, based on the determination, determining whether to allow the response from the port driver to pass to the class driver.

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2. (Previously Presented) In the SAN of claim 1, wherein the operating system is a Windows NT™ operating system, the further improvement wherein the filter blocks claiming of a selected storage device by returning a failure code to the class driver in response to its invocation of the port driver for purposes of claiming that storage device.
3. (Previously Presented) In the SAN of claim 22, wherein the operating system is a Windows 2000™ operating system, and the filter blocks claiming of a selected storage device by returning a failure code in response to ~~such~~ the claim request.
4. (Original) In the SAN of claim 1, the further improvement comprising an element in communication with the filter and transmitting thereto identifiers of one or more storage devices for which claiming is to be any of blocked and not blocked.
5. (Original) In the SAN of claim 4, the further improvement wherein the element comprises a further digital data processor that is coupled for communication with the selected digital data processor.
6. (Original) In the SAN of claim 4, the further improvement wherein

the element transmits to the filter identifiers of one or more storage devices for which claiming is not to be blocked,

the filter intervening to block claiming of fiber channel storage devices other than those identified for which claiming is not to be blocked.
7. (Original) In the SAN of claim 4, the further improvement wherein the class driver creates a disk object upon successfully claiming a storage device, the further improvement comprising an agent that blocks access by the operating system or an application executing thereon to a selected storage device for which such a disk object has already been created by

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invalidating the disk object for that device and that, optionally, unblocks access to that storage device by re-validating that disk object.

8. (Original) In the SAN of claim 7, the further improvement wherein the agent comprises software executing on the digital data processor.

9. (Previously Presented) In the SAN of claim 4, wherein the

port driver identifies the one or more storage devices coupled to the adapter,

the class driver invokes the port driver during initialization of the operating system for purposes of claiming the one or more storage devices identified by the port driver as being coupled to the selected digital data processor,

the further improvement wherein

the filter responds to identification of a storage device for which storage device claiming is not to be blocked and for which storage device claiming had previously been blocked by invoking the port driver for purposes of claiming the one or more storage devices identified by the port driver as being coupled to the selected digital data processor.

10. (Currently Amended) In a storage area network (SAN) comprising one or more digital data processors in communication with one or more storage devices, wherein at least a selected one of the digital data processors operates under a Windows(TM) operating system having

a port driver defining a software interface between a class driver and an adapter to which one or more of the storage devices are coupled,

the class driver for claiming one or more of the storage devices for access by the operating system and any application programs executing therein by invoking the port driver to which the selected digital data processor is coupled,

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the improvement comprising:

a manager digital data processor that is coupled to the selected digital data processor and that assigns one or more selected storage devices thereto,

the manager digital data processor communicating identifiers of the selected storage devices to a filter operating in conjunction with the selected digital data processor,

the filter in communication with the port driver and the class driver, the filter intervening to block claiming of storage devices other than those identified by the manager digital data processor,

the class driver issuing a claim request to the port driver for a selected one of the storage devices,

the port driver issuing a response to the class driver,

the filter blocking such claiming by intercepting the response from the port driver, determining whether the selected storage device has been assigned to the selected digital data processor, and in response to determining that the selected storage device has not been assigned, returning a failure code to the class driver in response to its invocation of the port driver for purposes of claiming a storage device.

11. (Original) In the SAN of claim 10, the further improvement wherein the selected digital data processor is coupled to the one or more storage devices by a first network.

12. (Original) In the SAN of claim 11, wherein the manager digital data processor is coupled to the selected digital data processors by a second network.

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13. (Original) In the SAN of claim 12, wherein the first network comprises fiber channel and the second network is an IP network.

14. (Original) In the SAN of claim 11, the further improvement comprising a graphical user interface coupled to the manager digital data processor that facilitates operator identification of one or more storage devices to be assigned to the selected digital data processor.

15. (Previously Presented) In a storage area network (SAN) comprising one or more digital data processors in communication with one or more storage devices, wherein at least a selected one of the digital data processors operates under a Windows(TM) 2000 operating system having

a port driver defining a software interface between a class driver and an adapter to which one or more of the storage devices are coupled,

the class driver for claiming one or more of the storage devices for access by the operating system and any application programs executing therein by invoking the port driver to which the selected digital data processor is coupled,

the improvement comprising:

a manager digital data processor that is coupled to the selected digital data processor and that assigns one or more selected storage devices thereto,

the manager digital data processor communicating identifiers of the selected storage devices to a filter operating in conjunction with the selected digital data processor,

the filter in communication with the port driver and the class driver, the filter intervening to block claiming of storage devices other than those identified by the manager digital data processor,

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the class driver issuing a claim request to the port driver for a selected one of the storage devices,

the filter blocking such claiming by intercepting the claim request from the class driver to the port driver for purposes of claiming a storage device, wherein, in response to determining that the selected storage device has not been assigned to the selected digital data processor, the filter blocks the claim request to prevent the class driver from creating a device object for the selected storage device.

16. (Original) In the SAN of claim 15, the further improvement wherein the selected digital data processor is coupled to the one or more storage devices by a first network.

17. (Original) In the SAN of claim 16, wherein the manager digital data processor is coupled to the selected digital data processors by a second network.

18. (Original) In the SAN of claim 17, wherein the first network comprises fiber channel and the second network is an IP network.

19. (Original) In the SAN of claim 16, the further improvement comprising a graphical user interface coupled to the manager digital data processor that facilitates operator identification of one or more storage devices to be assigned to the selected digital data processor.

20. (Previously Presented) In a storage area network (SAN) comprising one or more digital data processors in communication with one or more storage devices, wherein at least a selected one of the digital data processors operates under a Windows 2000™ operating system having

a port driver defining a software interface between a class driver and an adapter to which one or more of the storage devices are coupled,

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the class driver for claiming one or more of the storage devices for access by the operating system and any application programs executing therein by invoking the port driver to which the selected one of the digital data processors is coupled,

a plug-n-play manager that invokes the port driver to populate a data structure with data pertaining to one or more storage devices that are coupled to the adapter by issuing a request packet,

the improvement comprising:

a filter in communication with the port driver, the filter intercepting the request packet from the plug-n-play manager to the port driver and blocking access to selected ones of the storage devices by determining which ones of the storage devices are to be masked and removing from the data structure at least selected data pertaining those determined storage devices, wherein removal of the selected data prevents the class driver from creating device objects for the determined storage devices.

21. (Previously Presented) In the SAN of claim 20, the further improvement wherein the filter responds to identification of a storage device for which storage device claiming is not to be blocked and for which storage device claiming had previously been blocked by invoking the port driver to populate a data structure with data pertaining to one or more storage devices that are coupled the adapter.

22. (Previously Presented) In a storage area network (SAN) comprising one or more digital data processors in communication with one or more storage devices, wherein at least a selected one of the digital data processors operates under an operating system having

a port driver defining a software interface between a class driver and an adapter to which one or more of the storage devices are coupled,

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the class driver for claiming one or more of the storage devices for access by the operating system and any application programs executing therein by invoking the port driver to which the selected digital data processor is coupled,

the improvement comprising:

a filter in communication with the port driver and the class driver, the filter intervening to block claiming of one or more of the storage devices by the class driver by intercepting a request packet having an associated data structure issued to the port driver and blocking access to selected ones of the storage devices by determining which ones of the storage devices are to be masked and removing from the data structure at least selected data pertaining those determined storage devices, wherein removal of the selected data prevents the class driver from creating device objects for the determined storage devices.

23. (Currently Amended) A method in a storage area network (SAN) comprising one or more digital data processors in communication with one or more storage devices, wherein at least a selected one of the digital data processors operates under an operating system having a port driver defining a software interface between a class driver and an adapter to which one or more of the storage devices are coupled, the class driver for claiming one or more of the storage devices for access by the operating system and any application programs executing therein by invoking the port driver to which the selected digital data processor is coupled, the method comprising:

issuing a claim request by the class driver to the port driver for a selected one of the storage devices,

issuing a response by the port driver to the class driver,
intercepting the response from the port driver by a filter, wherein the filter determines whether the selected storage device has been assigned to the selected digital data ~~possessor~~ processor, and based on said determination, determines whether to allow the response from the port driver to pass to the class driver.

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24. (Previously Presented) A method in a storage area network (SAN) comprising one or more digital data processors in communication with one or more storage devices, wherein at least a selected one of the digital data processors operates under an operating system having a port driver defining a software interface between a class driver and an adapter to which one or more of the storage devices are coupled, the class driver for claiming one or more of the storage devices for access by the operating system and any application programs executing therein by invoking the port driver to which the selected digital data processor is coupled, the method comprising:

intervening with a filter in communication with the port driver and the class driver to block claiming of one or more of the storage devices by the class driver by intercepting a request packet having an associated data structure issued to the port driver and blocking access to selected ones of the storage devices by determining which ones of the storage devices are to be masked and removing from the data structure at least selected data pertaining those determined storage devices, wherein removal of the selected data prevents the class driver from creating device objects for the determined storage devices.

25. (Currently Amended) A program stored in a computer readable medium in a storage area network (SAN) comprising one or more digital data processors in communication with one or more storage devices, wherein at least a selected one of the digital data processors operates under an operating system having a port driver defining a software interface between a class driver and an adapter to which one or more of the storage devices are coupled, the class driver for claiming one or more of the storage devices for access by the operating system and any application programs executing therein by invoking the port driver to which the selected digital data processor is coupled, the program when executed by a computer being capable of:

issuing a claim request by the class driver to the port driver for a selected one of the storage devices,

issuing a response by the port driver to the class driver,
intercepting the response from the port driver by a filter, wherein the filter determines whether the selected storage device has been assigned to the selected digital data ~~possessor~~ processor, and based on said determination, determines whether to allow the response from the port driver to pass to the class driver.

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26. (Currently Amended) A program stored in a computer readable medium in a storage area network (SAN) comprising one or more digital data processors in communication with one or more storage devices, wherein at least a selected one of the digital data processors operates under an operating system having a port driver defining a software interface between a class driver and an adapter to which one or more of the storage devices are coupled, the class driver for claiming one or more of the storage devices for access by the operating system and any application programs executing therein by invoking the port driver to which the selected digital data processor is coupled, the program when executed by a computer being capable of:

intervening with a filter in communication with the port driver and the class driver to block claiming of one or more of the storage devices by the class driver by intercepting a request packet having an associated data structure issued to the port driver and blocking access to selected ones of the storage devices by determining which ones of the storage devices are to be masked and removing from the data structure at least selected data pertaining those determined storage devices, wherein removal of the selected data prevents the class driver from creating device objects for the determined storage devices.